

Effect of supplementary copra meal on methane production in an *in vitro* incubation using rice straw and cassava pulp as substrate

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Introductions

- **Slow and limited ruminal degradation of carbohydrates, low content of nitrogen are main deficiencies of rice straw, affecting its value as feed for ruminants (Van Soest, 2006) and more produce rumen methane**
- **Oil in copra meal is particularly efficient in de-faunating rumen and reducing methane production. Adding copra meal to the diet gives comparable decreases in CH₄ to refined coconut oil**
- **Aims to convert calves into quality beef or heifers and reduce methane production by using rice straw basal diets supplemented copra meal**



Methodology of research

- *In-vitro* procedure will be described by Sangkhom Inthapanya et al. (2011)
- Experiment was arranged as a 3*3 factorial design with 9 treatments and 4 repetitions.
 - First factor was ratio of rice straw and cassava pulp with 80:20, 60:40 and 40:60
 - Second factor was copra meal supplementation with 0, 2 and 4% of diet DM

Data collection and analysis

- Gas volume will be measured by water displacement
- Methane percentage will be measured by Gasboard 3800E
- DM and N will be determined according to AOAC (1990)
- Ammonia concentration was measured by Kjeldahl method
- VFAs concentration assessed by gas chromatograph as described by Erwin et al. (1961)
- Number protozoa total was counted by microscope with manification of 40 times



Table 1. Gas production, percentage of methane in gas according the lengths of incubation

Rice straw:Cassava pulp (%)	40:60			60:40			80:20		
Copra meal (%)	0	2	4	0	2	4	0	2	4
Gas production, ml									
0 – 6 hours	500	450	350	450	300	350	500	350	500
6 – 12 hours	150	200	200	300	100	250	250	150	200
12 – 24 hours	350	300	350	400	350	350	400	450	400
24 – 48 hours	150	150	150	250	250	300	300	150	250
Total	1,150	1,100	1,050	1,400	1,000	1,250	1,450	1,100	1,350
Methane, ml/g									
0 – 6 hours	41.90	32.67	21.32	38.12	22.95	28.60	45.60	29.23	43.85
6 – 12 hours	15.02	15.80	17.58	27.93	7.94	21.65	23.90	13.68	18.18
12 – 24 hours	36.61	26.16	35.14	39.80	31.19	34.02	43.04	48.24	39.68
24 – 48 hours	28.08	26.10	26.76	32.53	27.90	36.72	58.02	21.86	43.98

Table 2. Gas production, percentage of methane in the gas according the ratio of rice straw and cassava pulp and copra meal supplementation

Measurements	Rice Straw:cassava pulp (%DM)			SEM	P	Copra meal (% DM)			SEM	P	P ₁₊₂
	80:20	60:40	40:60			0	2	4			
Total gas, ml	620	623	693	5.02	0.013	727	567	643	4.81	0.000	0.004
Methane, %	8.77	7.68	9.13	4.45	0.02	9.14	7.98	8.46	2.65	0.086	0.994
Methane, ml/g	21.54	23.29	28.62	5.22	0.011	28.7	20.25	24.5	6.87	0.003	0.657



Lessons learned and suggestions

Methan reduction (%)	Rice straw:Cassava pulp (% DM)			Copra meal (% DM)		
	80:20	60:40	40:60	0	2	4
Total gas	0	+0.005	+0.12	0	-0.22	-0.12
Methane, %	0	- 0.14	+0.04	0	-0.13	-0.07
Methane, ml/g	0	+0.08	+0.33	0	-0.29	-0.15

- Reduction in methane production when rice straw, cassava pulp and copra meal were combined, was greater than in 40:60 of rice straw and cassava pulp with copra meal supplementation at 4% of diet DM
- Methane reduction in diets was from 11.5 to 22% in copra meal supplementation at 4 and 2 % of diet DM compared with only rice straw diet

